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(54) **Method of mounting a carrier for a microelectronic silicon chip.**

(57) A chip carrier (11) is to be mounted on a substrate (13) which includes a thermally conductive layer (14). A hole is formed in an insulating layer (15) to expose the thermally conductive layer (14) and the hole is filled with a thermally conductive material (18). A metallised zone (20) of the carrier overlays the material (18) and is soldered thereto with the same solder as is used to make electrical connections (12, 17, 19) to the carrier (11).

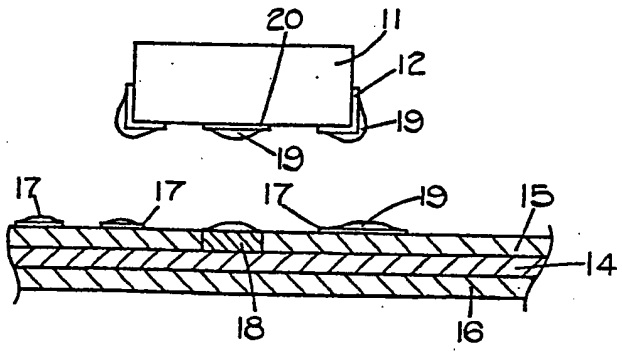

FIG.2.

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It is an object of the invention to provide a method of reducing the thermal resistance between a silicon chip carrier and a supporting substrate, such that stresses due to differential expansion are reduced.

According to the invention there is provided a method of mounting a carrier of a microelectronic silicon chip on to an electrically insulating support which includes a layer of high thermal conductivity, said method including the steps of making a thermal connection between said layer and an electrically insulating surface of said support at a location thereon where said carrier is to be secured, metallising a zone of a face of said carrier which is to lie adjacent said support, and soldering said metallised zone to said thermal connection.

Embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings in which:-

Figure 1 is a plan view of a micro-chip carrier;

Figure 2 shows, somewhat diagrammatically, an intermediate stage in attaching a chip carrier to a printed wiring board;

Figure 3 is a view, corresponding to Figure 2, showing the carrier attached to the board, and

Figure 4 shows an alternative method of making a thermal connection between a chip carrier and a multilayer substrate.

It will be understood that the board 13 could be a known type of double sided printed wiring board.

It will also be understood that the board 13 could alternatively comprise known type of multilayer substrate having a large number of wiring interconnections at different levels and provided with outer insulating layers corresponding to the layer 15 described above, one or both of the outer layers covering a thermally conductive layer corresponding to the layer 14.

Such an board 30 is shown in Figure 4 and comprises a multilayer substrate 31 of a known type which includes a plurality of insulating layers provided with through conductors known as "vias", and with embedded conductive connections, the vias passing between the substrate layers to contact selected ones of the aforesaid conductive connections, so as to provide required electrical connections between chip carriers or other components on both sides of the assembly. The substrate 31 is coated on both sides with insulating adhesive layers 33 and over these are located molybdenum sheets 34 having a high thermal conductivity and provided with apertures 35 at locations adjacent those where it has previously been determined that terminals of chip carriers will be positioned. Copper foil-clad insulating sheets 36 are adhesively mounted on the sheets 34, and the layers are pressed together to effect bonding and to cause the insulating adhesive 33 to flow into the apertures 35.

CLAIMS

1. A method of mounting a carrier (11 or 37) of a microelectronic silicon chip on to an electrically insulating support (13 or 30) which includes a layer (14 or 34) of high thermal conductivity, said method including the steps of making a thermal connection (18 or 45) between said layer (14 or 34) and an electrically insulating surface (15 or 36) of said support (13 or 30) at a location thereon where said carrier (11 or 39) is to be secured, metallising a zone (20 or 44) of a face of said carrier (11 or 39) which is to lie adjacent said support (13 or 30) and securing said zone (20 or 44) to said thermal connection (18 or 45) by means of a thermally conductive material (19 or 43), characterised in that said zone (20 or 44) is secured to said thermal connection (18 or 45) by means of the solder which is used to secure terminals (12 or 38) of the carrier (11 or 39) to a wiring pattern on the support (13 or 30).

2. A method as claimed in claim 1 in which said thermal connection is made by forming a hole in said insulating surface (15 or 36) to expose said layer (14 or 34) of high thermal conductivity, and introducinga thermally conductive material (18 or 45) into said hole.

3. A method as claimed in claim 2 in which said introduction of thermally conductive material (45) into said hole (40) is effected by plating.

4. A method as claimed in claim 2 or claim 3 in which solder (43) is introduced into said hole (40).

5. A method as claimed in claim 2 or claim 3 in which a plurality of said holes (40) are formed and a thermally conductive material (45) is introduced into each.

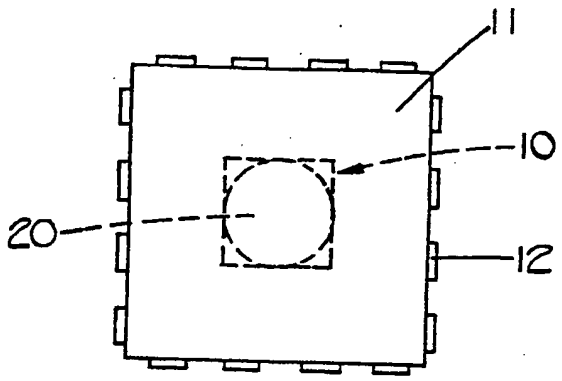

FIG.1.

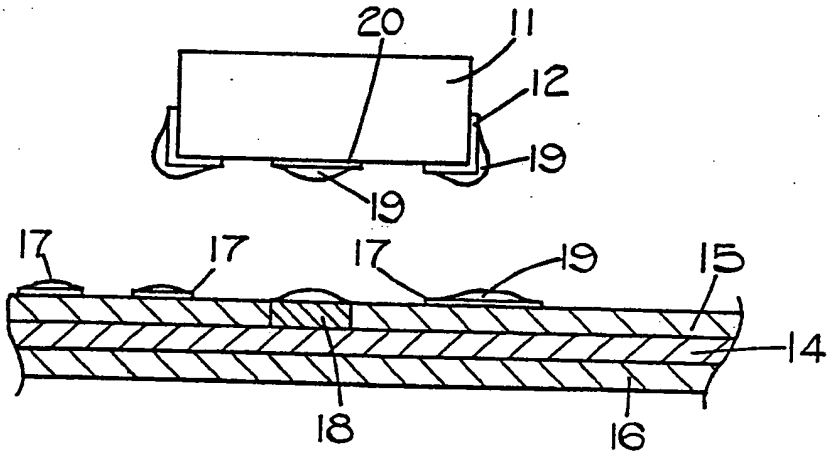

FIG.2.

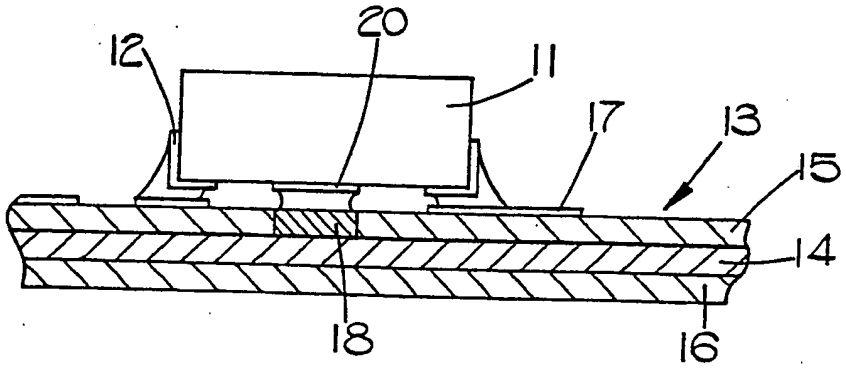

FIG.3

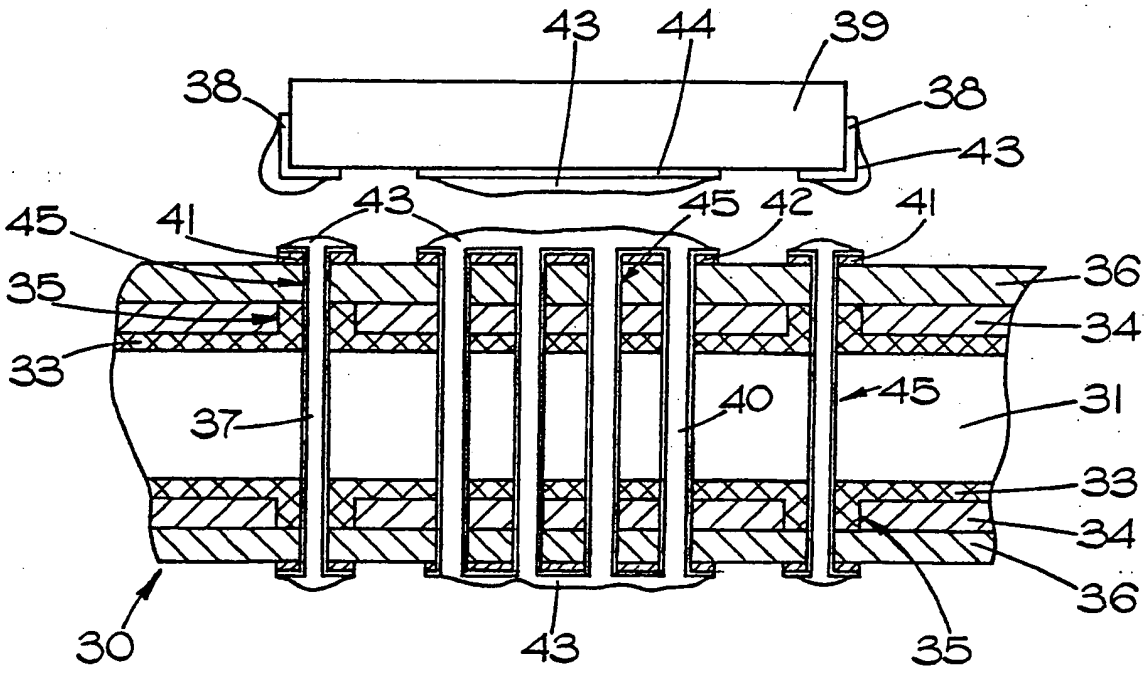

FIG. 4.